ONTARIO MINISTRY OF ENVIRONMENT
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ANNUAL REPORT 1965

RICHMOND HILL

water pollution control plant

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1965
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DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

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R53
1965

Richmond Hill : water pollution control plant.

81844

ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Richmond Hill Local Advisory Committee,
Town of Richmond Hill.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the Richmond Hill Water Pollution Control Plant, OWRC Project No. 57-S-6.

We appreciate the co-operation you have extended to our Operations staff throughout the year, and trust that continuation of this close association will ensure even greater progress in the sphere of water pollution control.

Yours very truly,

D. S. Caverly,
General Manager.

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET
TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to provide you with the 1965 Annual Report on the operation of the Richmond Hill Water Pollution Control Plant, OWRC Project No. 57-S-6.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

RICHMOND HILL

water pollution control plant

operated for

THE TOWN OF RICHMOND HILL

by the

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN: Dr. James A. Vance

VICE-CHAIRMAN: J. H. H. Root, M.P.P.

COMMISSIONERS

W. D. Conklin, Q. C.
D. A. Moodie
H. E. Brown
L. E. Venchiarutti

GENERAL MANAGER: D. S. Caverly

ASSISTANT GENERAL MANAGERS

L. E. Owers
F. A. Voege
K. H. Sharpe
A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: D. A. McTavish
Operations Engineer: R. Kauppinen

801 Bay Street Toronto 5

'65 REVIEW

The cost of operating the Richmond Hill Water Pollution Control Plant in 1965 ($50,984) was slightly below the 1964 figure of $51,049. The cost of treatment, however, was also lower at $89.50 per million gallons in 1965 compared to $108.10 in 1964.

The plant treated a total flow of 569.643 million gallons in 1965, an average of 1.56 million gallons per day and an increase of 21% over 1964. The average daily flow was near the design capacity of 1.6 million gallons per day.

A new blower was installed during the year to provide additional air to the aeration section, with the result that a good quality effluent was maintained at the plant despite the increased loadings.

GLOSSARY

BOD	biochemical oxygen demand (a measure of organic content)
cfm	cubic feet per minute
comminution	shredding of solids into small fragments
DWF	dry weather flow
effluent	outflow
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpcd	gallons per capita per day
gpm	gallons per minute
grit	sand, dust, stones, cinders and other heavy inorganic material
influent	inflow
lin. ft.	lineal feet
mgd	million gallons per day
mlss	mixed liquor suspended solids
ppm	parts per million
ss	suspended solids
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)

HISTORY
1951 – 1965

The present plant consists of three activated sludge treatment units in parallel and a common influent works. These three sections were completed in three separate stages. The first stage consisted of a primary sedimentation tank, aeration tanks, secondary sedimentation tank, digester and sludge drying beds. This original plant was rated at 180,000 gallons per day and was completed in 1951. The second stage was completed in 1956 and represented an increase in the treatment capacity of 450,000 gallons per day.

The final addition to the plant was completed in 1958. At this time, an additional digester was added as well as an extension to the sludge drying beds. The plant is now able to employ two stage digestion. This extension increased the capacity of the sewage treatment plant by 970,000 gallons per day, and included the building of an influent works which serves each of the three sections. The influent works consists of coarse screens, an aerated grit chamber and a barminutor. From there the sewage flow is split between the three sections. Any one section can be bypassed by closing a gate on the inlet to the primary sedimentation tank of that section.

The two extensions to the plant over the relatively short period since 1951 have resulted from a rapid increase in population over the past twelve years. The design population for the 1951 plant was 3,000 people. The two following design populations were 6,000 and 16,350.

The present plant is now capable of giving complete treatment to 1,600,000 gallons of sewage per day.

S. TOYE
CHIEF OPERATOR

Project Staff

Operators

R. H. Dennis
R. W. Karsh

Casual

R. B. Amodeo

COMMENTS

S. Toye, Chief Operator at the Richmond Hill plant, joined the OWRC as an operator at the North Bay plant. In September, 1961, he was transferred to Richmond Hill. Mr. Toye received a Certificate of Qualification as a Sewage Works Operator after completing the series of instruction courses sponsored by the OWRC.

Mr. Amodeo was employed continuously for a large part of the year 1965 and it is anticipated that he will be classified as an operator in 1966.

Description of Project

INFLUENT

The waste water enters the plant by means of three sewers - two eight inch diameter sewers along Markham Road and one eighteen inch diameter sewer from Pugsley Avenue.

The raw sewage first passes through a coarse bar screen to remove large objects and then flows to an aerated grit chamber where the velocity of flow is reduced sufficiently to allow grit and detritus material, which may damage plant machinery, to settle out. The air introduced in the chamber produces a roll which allows grit to settle out while keeping the organic material in suspension.

From the grit chamber the flow passes through a barminutor which screens and shreds the large particles to a size suitable for handling in the treatment units. From this point, the flow enters a flow division box where it may be proportioned among the four primary sedimentation tanks.

PRIMARY SEDIMENTATION

The primary sedimentation tanks are designed to provide an adequate detention period to allow the heavier solids to settle out, and for the removal of surface scum and grease. The heavier solids which settle out to the bottom of the tank and surface scum are collected by a scraper mechanism and withdrawn to a

sludge pit from where it is pumped to the primary digester.

The primary sedimentation tanks are designed to provide sufficient detention to allow removal of 30-35% of the heavy organic material.

The settled waste water flows over the effluent weirs and discharges to the aeration tanks.

AERATION

Settled sewage flows from the primary sedimentation tanks to the four aeration sections. There it is mixed with activated sludge which is returned from the final sedimentation tanks and aerated.

The aeration sections retain the sewage for 6 hours at a flow of 1.6 million gallons per day. Air is supplied by four blowers with a total capacity of approximately 2400 cubic feet of air per minute.

FINAL SEDIMENTATION

The aerated mixed liquor from the aeration sections is retained in four final sedimentation tanks for approximately two hours at design flow. This allows the activated sludge to settle. It is collected from the bottoms of the tanks and returned to the aeration sections. (Excess activated sludge is returned to the primary sedimentation tanks and is pumped from there to the digesters.) The remaining liquid flows over the weirs of the final sedimentation tanks to the chlorine contact chambers.

DIGESTION

Sludge digestion in this plant is performed in two stages called primary and secondary digestion.

The sludge from the primary tanks is pumped, with excess activated sludge to the primary digester. In the absence of air, and in a regulated temperature of 90° F., the decomposing or digestion process begins. Constant agitation within the tank insures overall treatment.

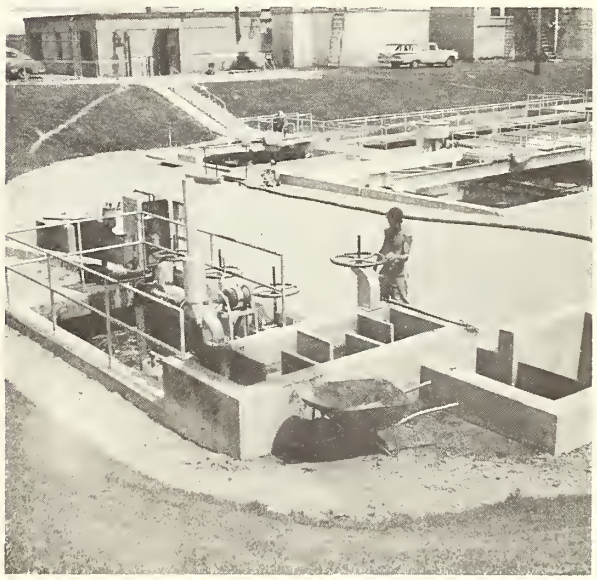
The raw sludge is broken down by anaerobic bacterial action and, when thoroughly digested, is a thick, dark, odourless liquid.

The secondary digester receives the digested material from the primary and completes the process. The secondary digester is not agitated but is allowed to be quiescent. The supernatant is decanted and returned to the treatment process.

Sludge gas, principally methane, formed during the process, is used as a fuel for the heat exchanger and boiler supplying heat to the digester and buildings. Oil is used as standby fuel.

CHLORINATION

From the final sedimentation tanks, the effluent flows to two chlorine contact chambers where it is chlorinated to reduce the bacterial count to within acceptable limits. It is then discharged to the creek.



INFLUENT WORKS

PROJECT COSTS

NET CAPITAL COST (Final) Long Term Debt to OWRC	$359,420.34
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1965	$ 61,079.90
Net Operating	$ 50,984.04
Debt Retirement	7,253.00
Reserve	1,904.46
Interest Charged	20,160.56
TOTAL	$ 80,302.06

RESERVE ACCOUNT

Balance at January 1, 1965	$ 22,441.44
Deposited by Municipality	1,904.46
Interest Earned	834.40
Less Expenditures	(11,136.80)
Balance at December 31, 1965	$ 14,043.50

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	*SUNDRY
JAN	2008.01	1078.74	283.76	132.81		448.06	27.70			36.94
FEB	3319.42	1078.74	283.76	144.96	529.54		13.12			1269.30
MARCH	4751.00	1141.42	292.51	130.29	534.04	672.08	91.36	447.29	154.82	1287.19
APRIL	3658.90	1004.48	301.10	136.50	529.42	336.04	36.91		108.11	1206.34
MAY	5235.35	1767.95	364.14	69.10	486.95	448.05	53.79		130.39	1914.98
JUNE	4709.02	1123.40	283.50	41.17	502.75	448.05	208.83		1144.70	956.62
JULY	3945.99	1151.80	427.11	26.51	594.91	448.05	105.57		70.91	1121.13
AUG	4438.63	1127.64	656.25	34.45	594.85	448.05	192.27		111.66	1273.46
SEPT	2668.31	1171.60	432.81	32.95	566.87	49.93	133.87	58.29	181.50	40.49
OCT	8055.17	1691.46	437.50	38.01	582.89	896.10	181.64	92.76	1181.03	2953.78
NOV	4015.16	1178.14	266.00	85.60	631.38	448.05	172.32	22.38	64.55	1146.74
DEC	4179.08	1456.71		178.97	1192.11	10.30	137.76	18.91	230.24	954.08
TOTAL	50984.04	14972.08	4028.44	1051.32	6745.71	4652.76	1355.14	639.63	3377.91	14161.05

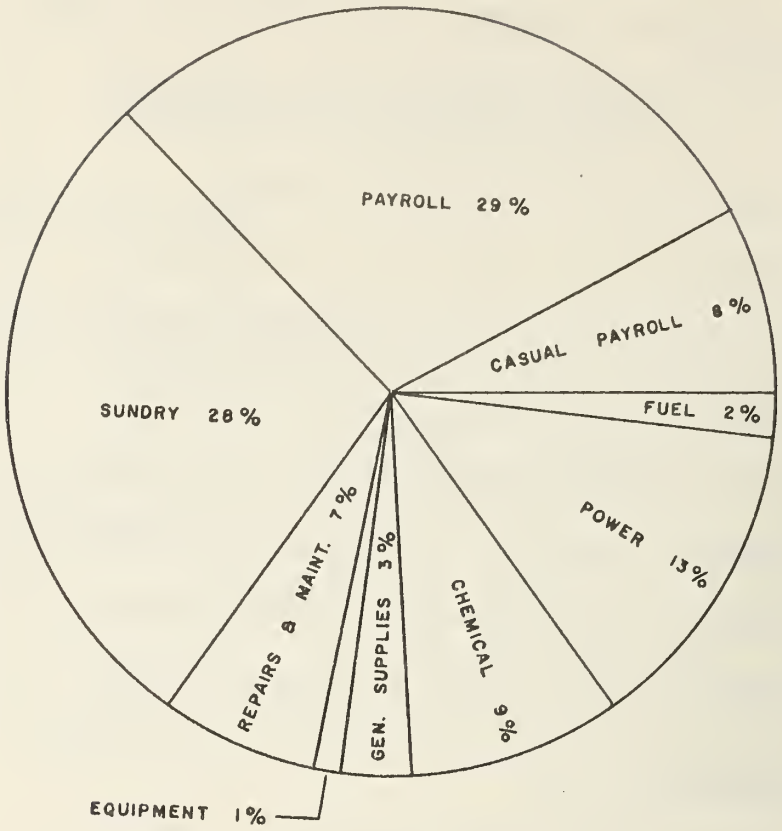
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $13,127.72

YEARLY OPERATING COSTS

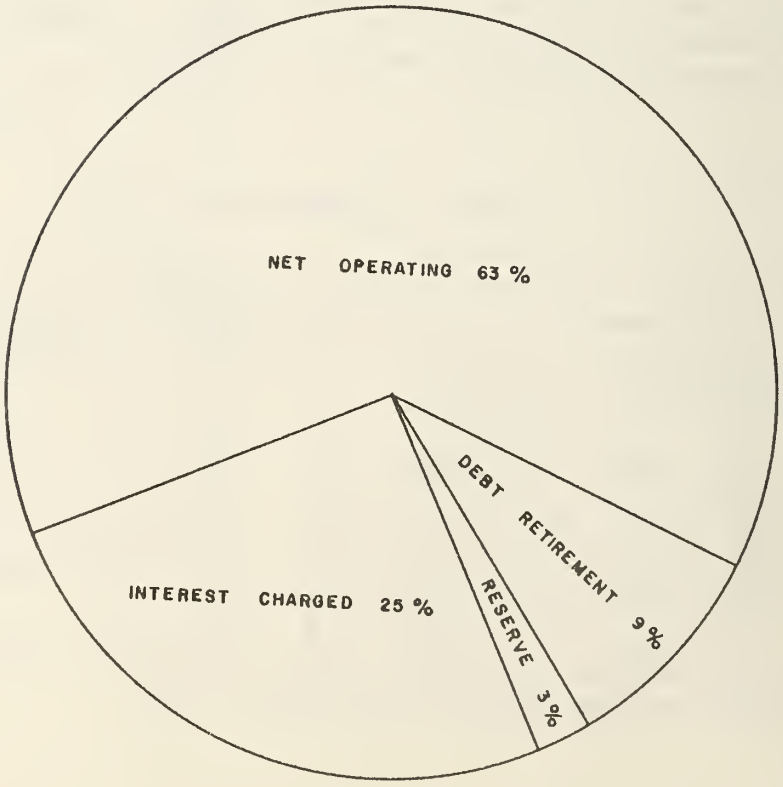
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	205.53	$44475.	* $ 9.32	$ 216.50	14 2/3 CENTS
1962	316.02	44420.	9.32	140.50	7 1/2 CENTS
1963	331.36	42954.	9.01	129.50	6 CENTS
1964	472.211	51049.	10.69	108.10	6 CENTS
1965	569.643	50984.	10.34	89.50	4 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

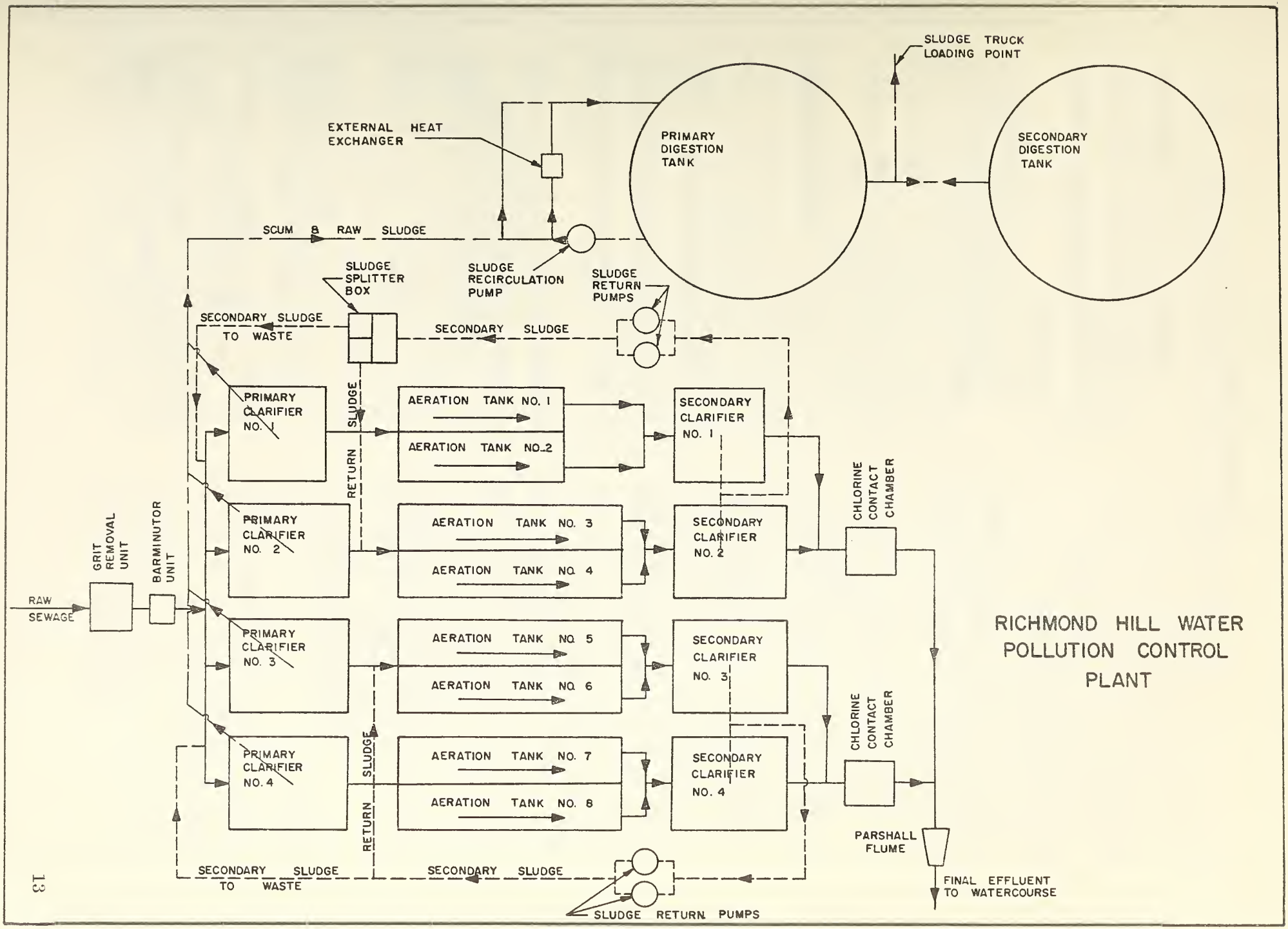
1965 OPERATING COSTS



TOTAL ANNUAL COST



Technical Section


SLUDGE TRUCK LOADING POINT
EXTERNAL HEAT EXCHANGER
PRIMARY DIGESTION TANK
SECONDARY DIGESTION TANK
SCUM & RAW SLUDGE
SLUDGE SPLITTER BOX
SLUDGE RECIRCULATION PUMP
SLUDGE RETURN PUMPS
SECONDARY SLUDGE TO WASTE
SECONDARY SLUDGE
PRIMARY CLARIFIER NO. 1
AERATION TANK NO. 1
AERATION TANK NO. 2
SECONDARY CLARIFIER NO. 1
SLUDGE
RETURN
PRIMARY CLARIFIER NO. 2
AERATION TANK NO. 3
AERATION TANK NO. 4
SECONDARY CLARIFIER NO. 2
CHLORINE CONTACT CHAMBER
GRIT REMOVAL UNIT
BARMINUTOR UNIT
RAW SEWAGE
PRIMARY CLARIFIER NO. 3
AERATION TANK NO. 5
AERATION TANK NO. 6
SECONDARY CLARIFIER NO. 3
CHLORINE CONTACT CHAMBER
PRIMARY CLARIFIER NO. 4
AERATION TANK NO. 7
AERATION TANK NO. 8
SECONDARY CLARIFIER NO. 4
PARSHALL FLUME
FINAL EFFLUENT TO WATERCOURSE
SECONDARY SLUDGE TO WASTE
SECONDARY SLUDGE
SLUDGE RETURN PUMPS
RICHMOND HILL WATER POLLUTION CONTROL PLANT

Design-Data

GENERAL

Type of Plant - Activated sludge.

Design Population - 16,000.

Design Plant Flow - 1,600,000 gallons per day.

Per Capita Flow - 100 gallons per day.

Five Day BOD -

Raw Sewage	-	200 PPM
Removal	-	90%

Suspended Solids -

Raw Sewage	-	220 PPM
Removal	-	95%

COARSE SCREEN

1 inch x 0.25 inches at approximately 3 inch centres.

AERATED GRIT TANK

Size - 15.5 ft. x 6 ft. x 9 ft. (SWD).

Volume - 837 cubic feet or 5,220 gallons.

Retention - 4.7 minutes at 1.6 MGD.

Channel - Grit decanting trough (baffled).
- 8.75 ft. x 3 ft. x 2.25 ft. (top of concrete).
- 5 round-the-end baffles and adjustable weir overflow.

SHREDDER

Barminutor - Chicago Pump Company Model B-18 inch.

FLOW DIVISION BOX

8 inch diameter pipe to 1951 section.

12 inch diameter pipe to 1955 section.

15 inch diameter pipe to 1957 section.

1951 PLANT

PRIMARY SEDIMENTATION TANK

Size - 16 ft. diameter x 10 ft. SWD.

Volume - 2010 cubic feet, or 12,550 gallons.

AERATION TANKS

Size - 2 each 58 ft. x 9 ft. x 9 ft. liquid depth.

Volume - 4700 cubic feet each or 58,600 gallons (total).

SECONDARY SEDIMENTATION TANK

Size - 19 ft. diameter x 10 ft. SWD.

Volume - 2835 cubic feet or 17,680 gallons.

1955 EXTENSION

PRIMARY SEDIMENTATION TANK

Size - 26 ft. diameter x 10 ft. SWD.

Volume - 5310 cubic feet or 33,100 gallons.

AERATION TANKS

Size - 2 each 81 ft. x 14.5 ft. x 10.25 ft. liquid depth.

Volume - 12,030 cubic feet each or 150,000 gallons (total).

SECONDARY SEDIMENTATION TANK

Size - 30 ft. diameter or 10 ft. SWD.

Volume - 7,060 cubic feet or 44,100 gallons.

CHLORINE CONTACT CHAMBER

Size - 25 ft. x 10 ft. x 8 ft. liquid depth.

Volume - 2,000 cubic feet or 12,500 gallons.

1957 EXTENSION

PRIMARY SEDIMENTATION TANK

Size - 2 each 26 ft. diameter x 9.7 ft. SWD.

Volume - 5,150 cubic feet each or 64,350 gallons (total).

AERATION TANKS

Size - 4 each 81 ft. x 14.5 ft. x 9.35 ft. SWD.

Volume - 10,980 cubic feet each or 274,000 gallons (total).

SECONDARY SEDIMENTATION TANK

Size - 2 each 30 ft. diameter x 9.67 ft. SWD.

Volume - 6,840 cubic feet each or 85,400 gallons (total).

CHLORINE CONTACT CHAMBER

Size - 25 ft. x 10 ft. x 8 ft. liquid depth.

Volume - 2,000 cubic feet or 12,500 gallons.

OVERALL PLANT

PRIMARY SEDIMENTATION TANKS

Volume - 12,550 (1) + 33,100 (2) + 64,350 (3&4) = 110,000 gallons.

Retention - 1.65 hours at 1.6 MGD.

Surface Settling Rate - 908 gallons per square ft. per day at 1.6 MGD.

Weir Overflow Rate - 4,880 gallons per lineal ft. of weir per day at 1.6 MGD.

AERATION TANKS

Volume - 58,600 (1) + 150,100 (2) + 274,000 (3&4)= 482,700gallons

Retention - 7.25 hours at 1.6 MGD (no return sludge).

- 5.9 hours at 1.6 MGD plus 25% return sludge.

SECONDARY SEDIMENTATION TANKS

Volume - 17,680 (1) + 44,100 (2) + 85,400 (3&4) = 147,180 gallons.

Retention - 2.21 hours at 1.6 MGD or 1.77 hours at 2.0 MGD.

Surface Settling Rate - 667 gallons per square ft. per day at 1.6 MGD.

Weir Overflow Rate - 4,120 gallons per lineal ft. of weir per day at 1.6 MGD.

CHLORINE CONTACT CHAMBERS

Volume - 12,500 (2) + 12,500 (3&4) = 25,000 gallons.

Retention - 22.5 minutes at 1.6 MGD.

SLUDGE DIGESTERS

Size (1951) - 30 ft. diameter x 19 ft. SWD.

Volume - 13,430 cubic feet.

Size (1957) - 50 ft. diameter x 20 ft. SWD.

Volume - 39,200 cubic feet.

TOTAL

Volume - 52,630 cubic feet.

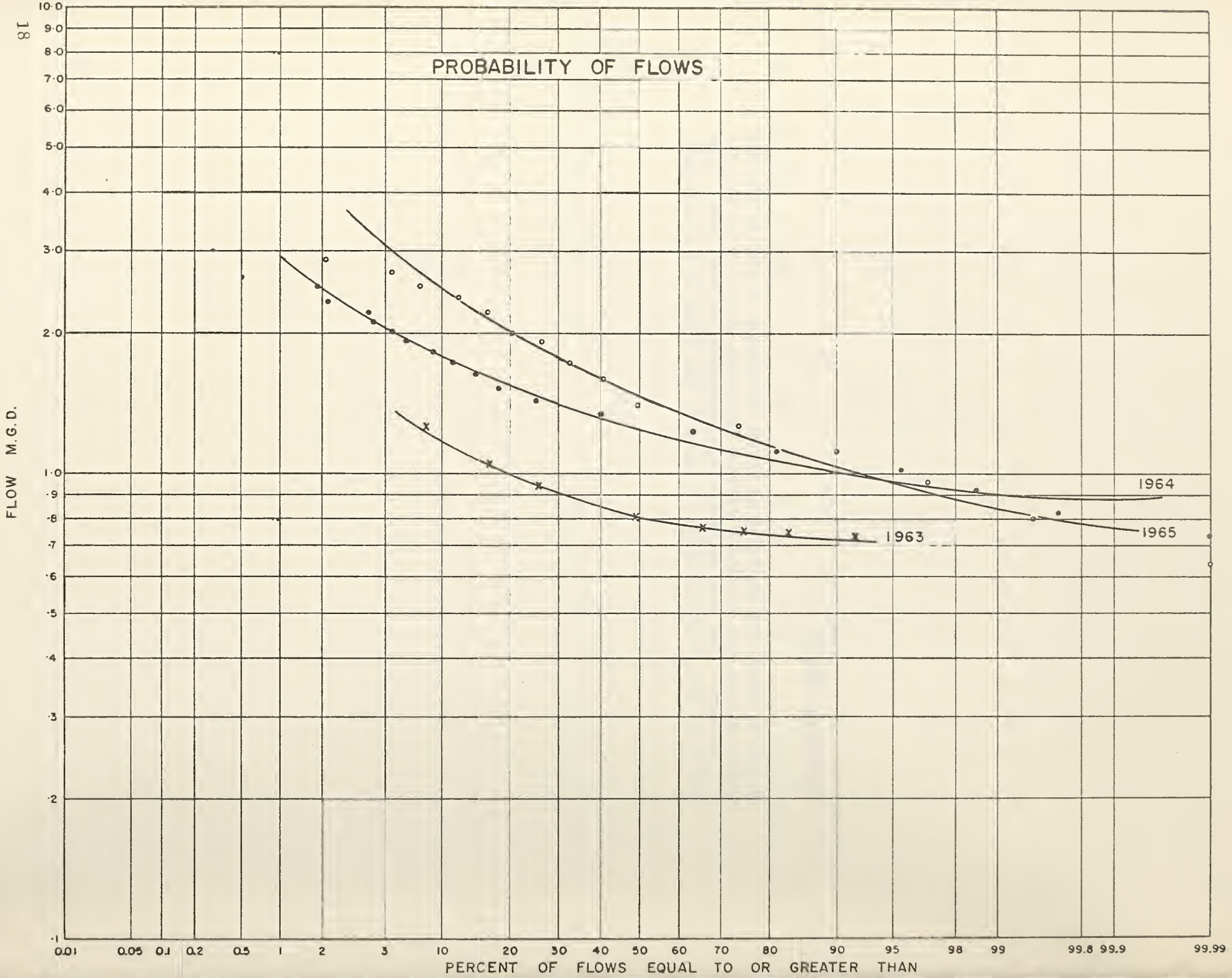
Capacity - 3.28 cubic feet per capita.

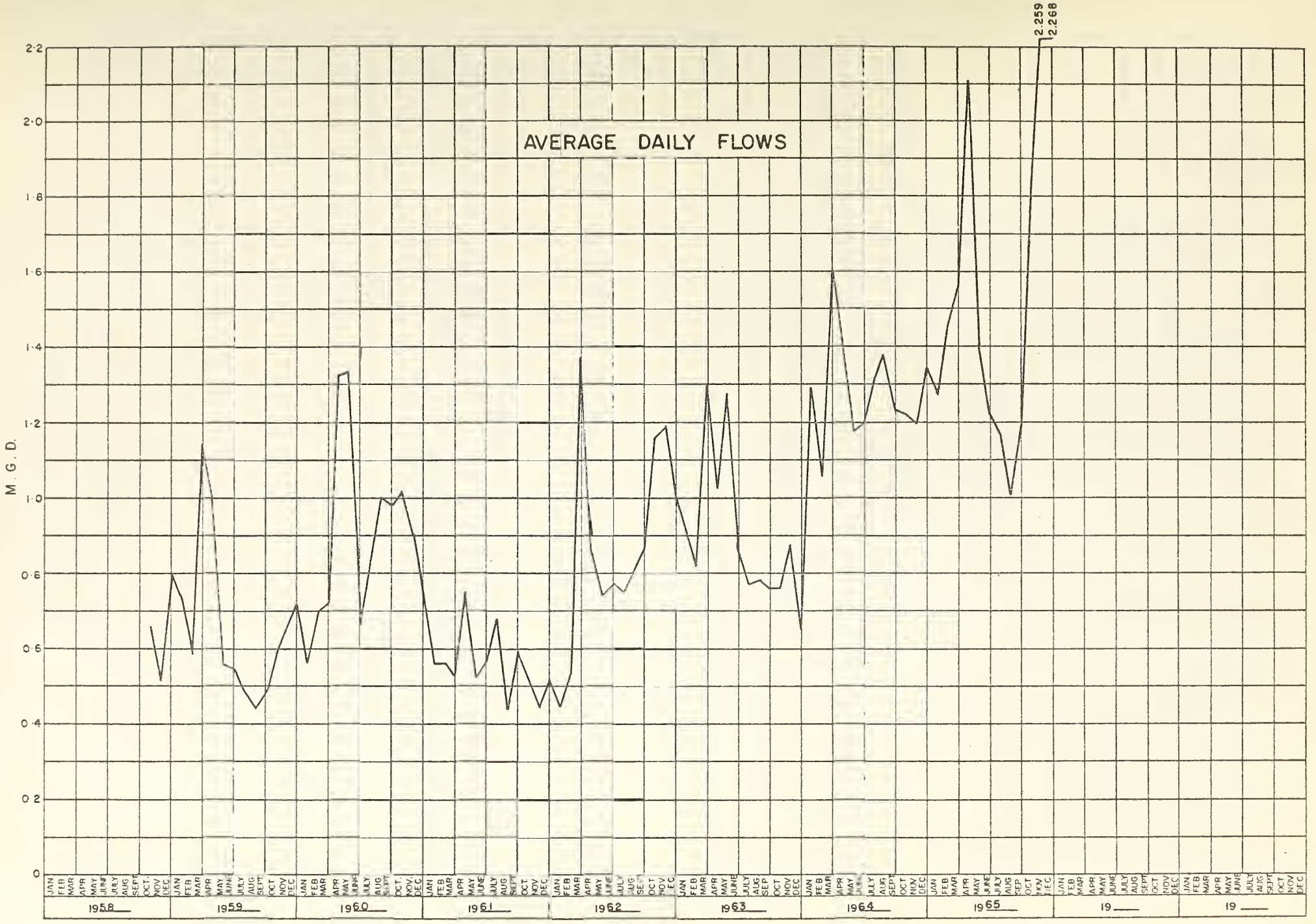
OUTFALL

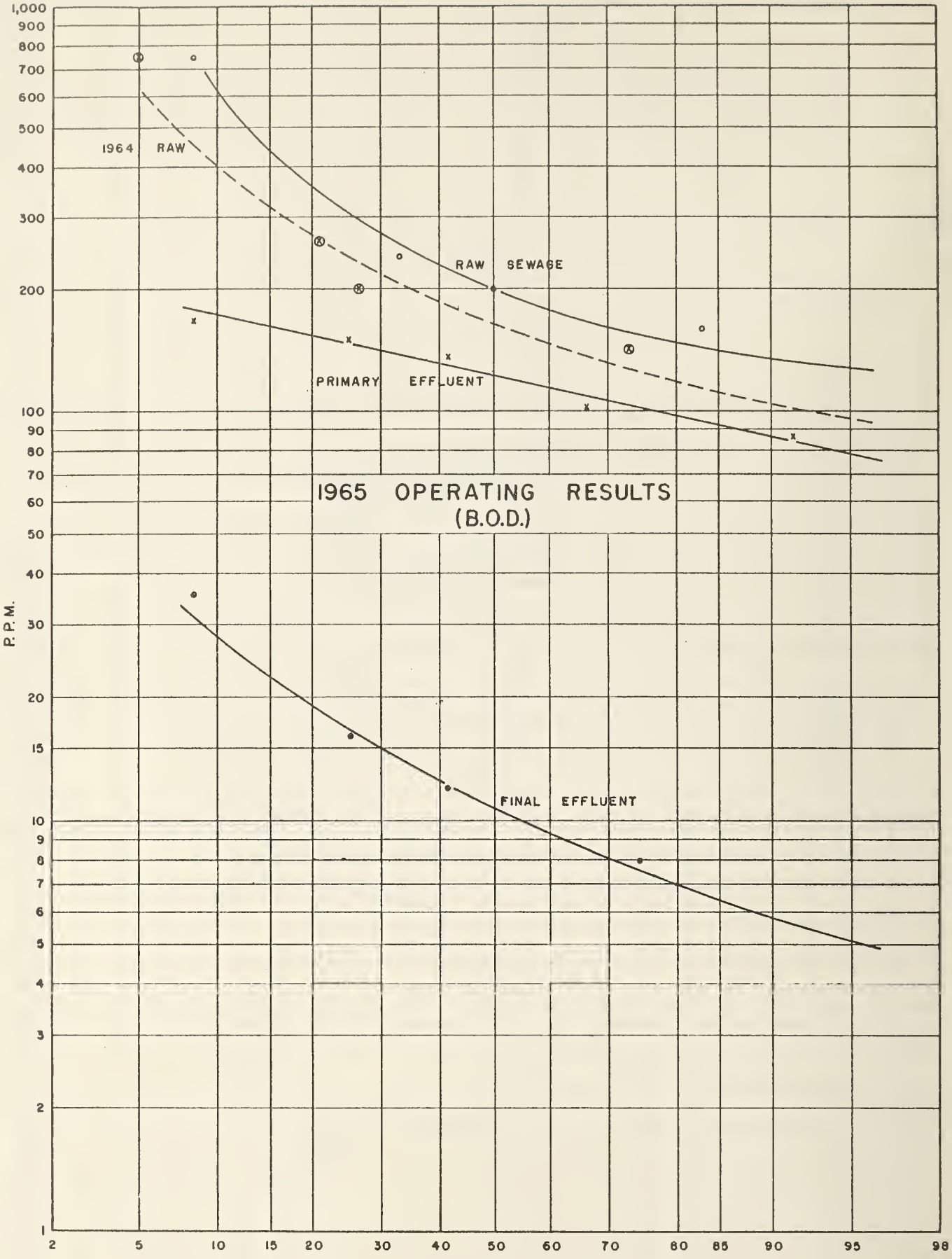
30 inch diameter concrete outfall sewer to German Mills Creek.

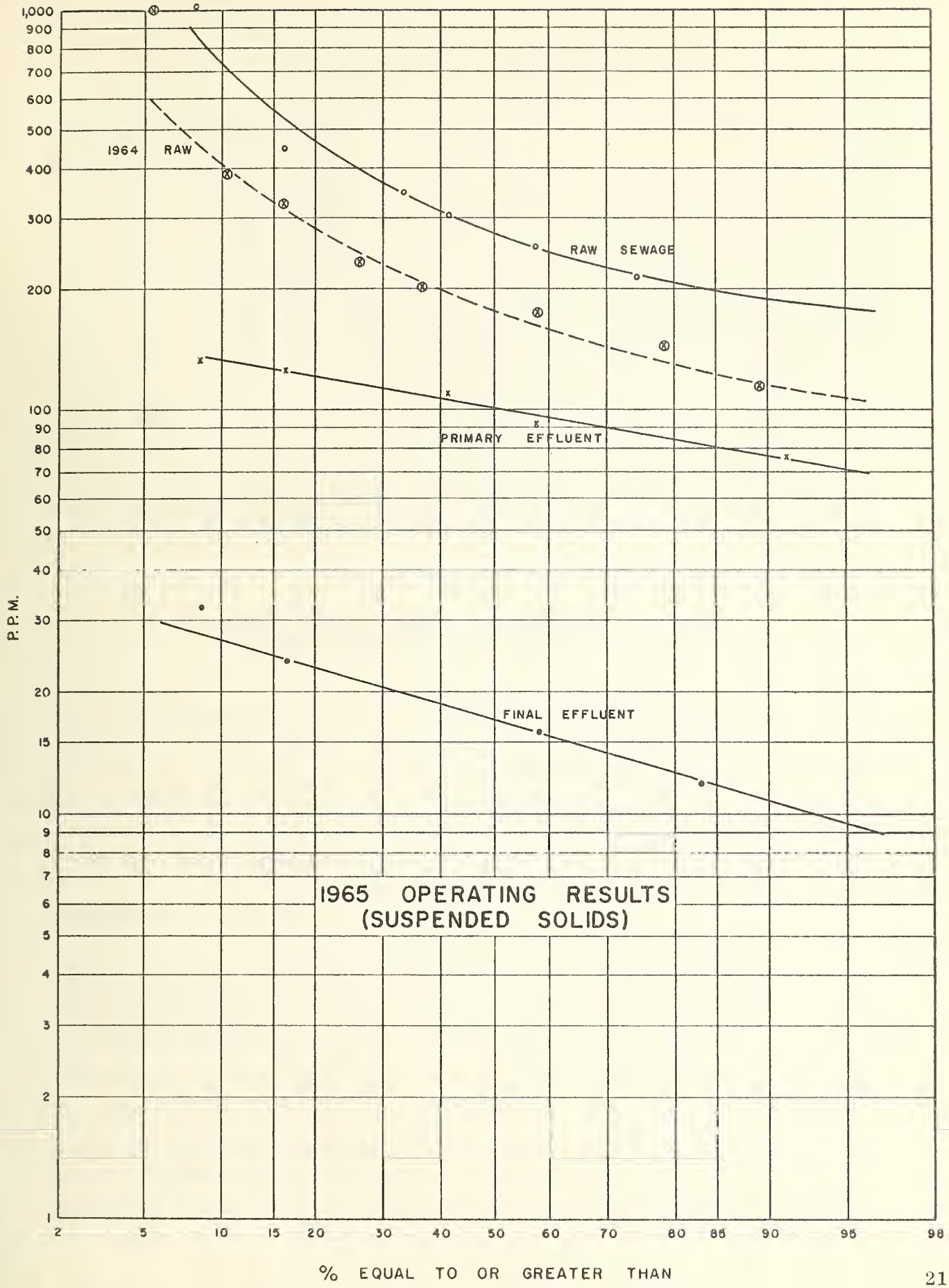
Process Data

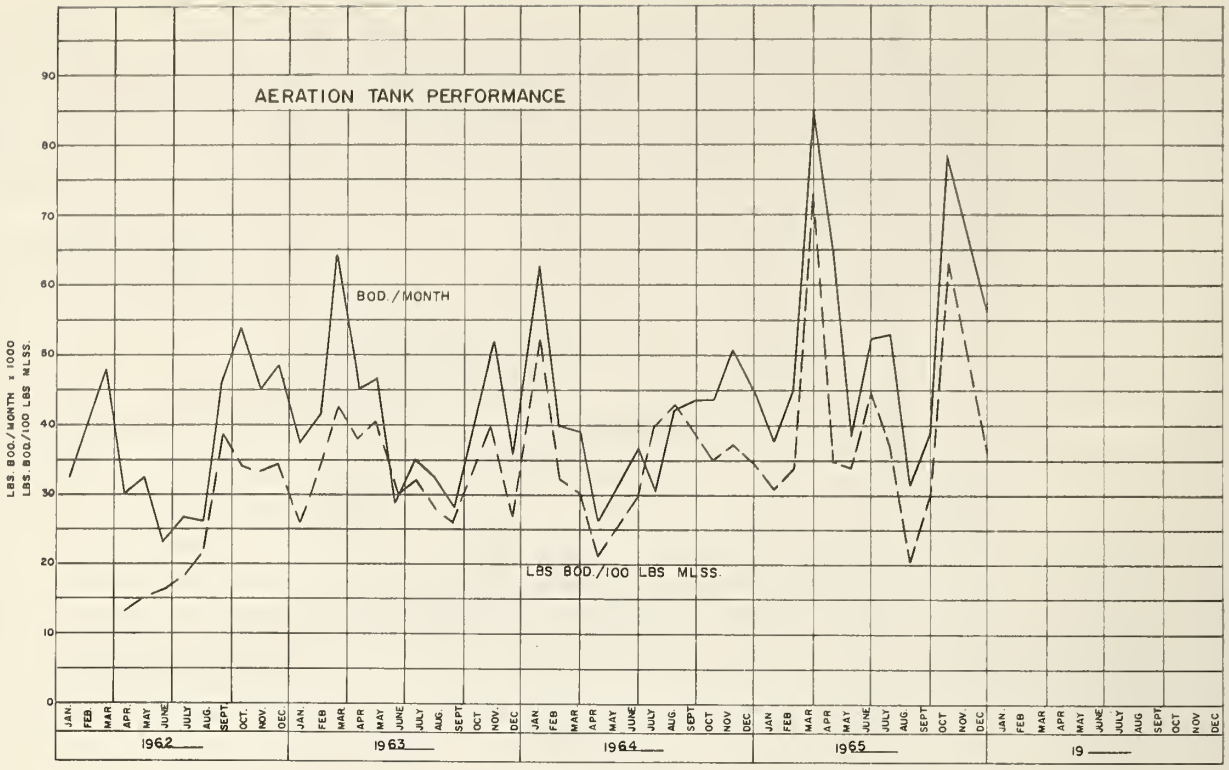
As will be noted from the following charts and graphs, a total of 569.643 million gallons was treated in 1965 for an average daily flow for the year of 1.560 mgd. This is an increase of approximately 21% over 1964. Also 40% of the time, flow was equal to or greater than design flow of 1.6 mgd.


PROBABILITY OF FLOWS
FLOW M.G.D.
10·0
9·0
8·0
7·0
6·0
5·0
4·0
3·0
2·0
1·0
·9
·8
·7
·6
·5
·4
·3
·2
·1
1964
1965
1963
0.01
0.05
0.1
0.2
0.5
1
2
3
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
PERCENT OF FLOWS EQUAL TO OR GREATER THAN

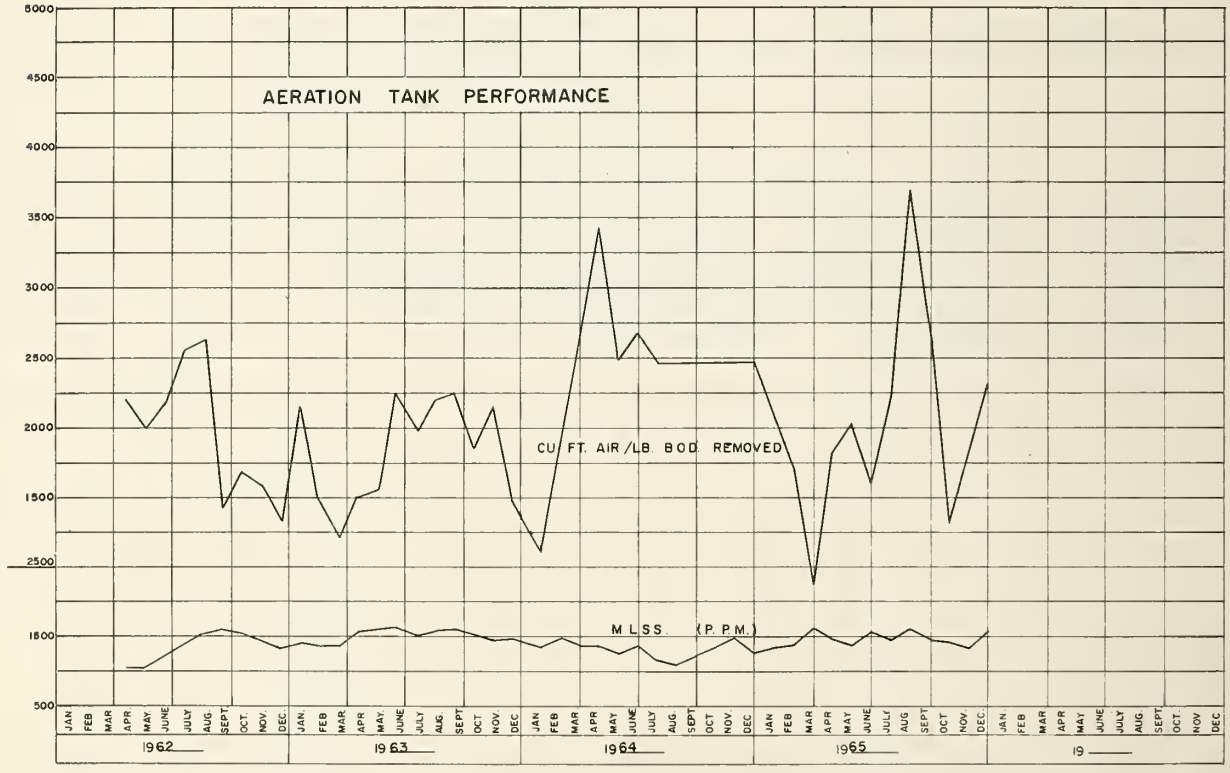

AVERAGE DAILY FLOWS
M. G. D.
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
2.259
2.268
1958
1959
1960
1961
1962
1963
1964
1965
19
19


1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
P.P.M.
1964 RAW
RAW SEWAGE
PRIMARY EFFLUENT
1965 OPERATING RESULTS
(B.O.D.)
FINAL EFFLUENT
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% EQUAL TO OR GREATER THAN


1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
P.P.M.
1964 RAW
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
1965 OPERATING RESULTS
(SUSPENDED SOLIDS)
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% EQUAL TO OR GREATER THAN



MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	170	15	91.0	30.6	159	10	93.5	29.4	124
FEB.	205	7.2	96.5	40.5	213	16	92.5	40.3	182
MAR.	225	38	83.0	45.4	277	31	89.0	59.7	120
APR.	250	15	94.0	74.5	442	18	96.0	134.4	121
MAY	170	13	92.5	34.4	338	14	96.0	71.1	120
JUNE	458	6	98.5	83.3	1019	15	98.5	185.0	120
JULY	135	8.6	93.5	22.9	160	9	94.5	27.4	129
AUG.	235	5.6	97.5	38.2	368	14	96.0	59.0	114
SEPT.	120	2.8	97.5	20.8	176	25	85.5	26.8	123
OCT.	185	6.2	96.5	50.4	286	18	93.5	75.6	125
NOV.	*211	12	94.5	64.4	337	17	95.0	103.6	129
DEC.	170	11	93.5	55.9	272	17	94.0	89.6	134
TOTAL	-	-	-	566.8	-	-	-	911.4	1541
AVG.	211	12	94.5	47.2	337	17	95.0	76.0	128

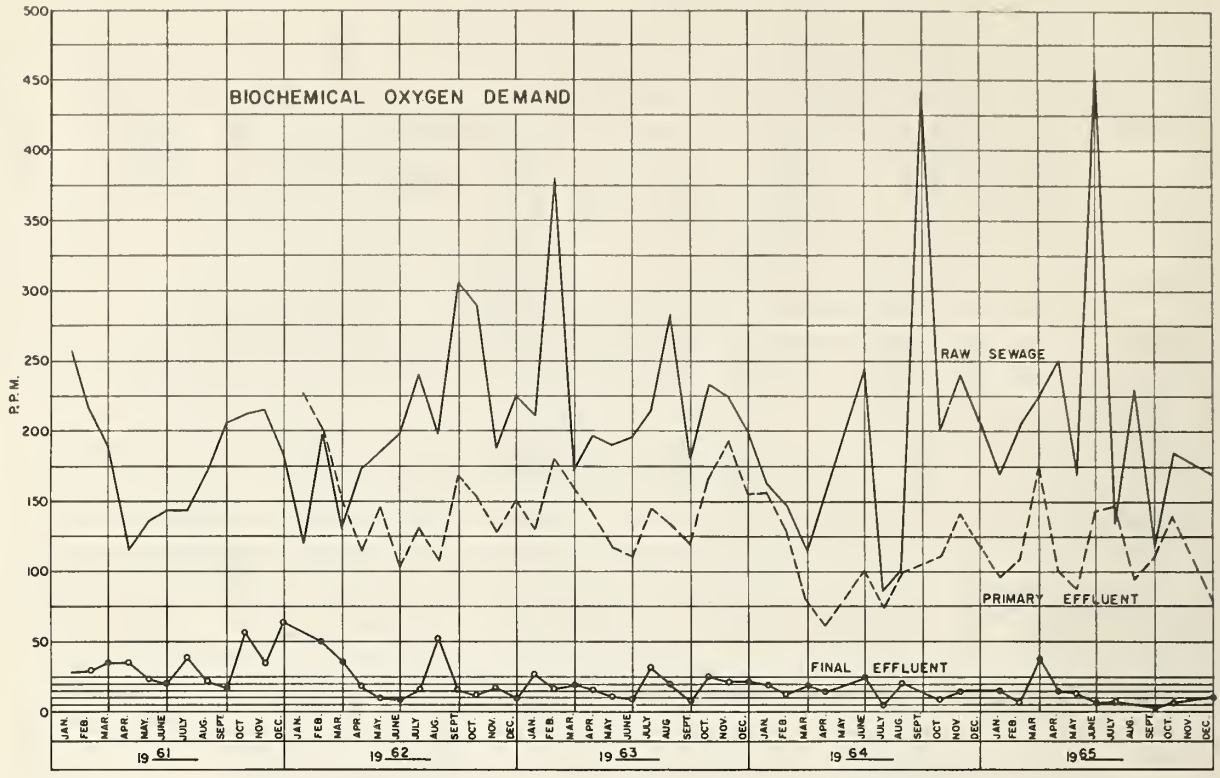
* Average values substituted.

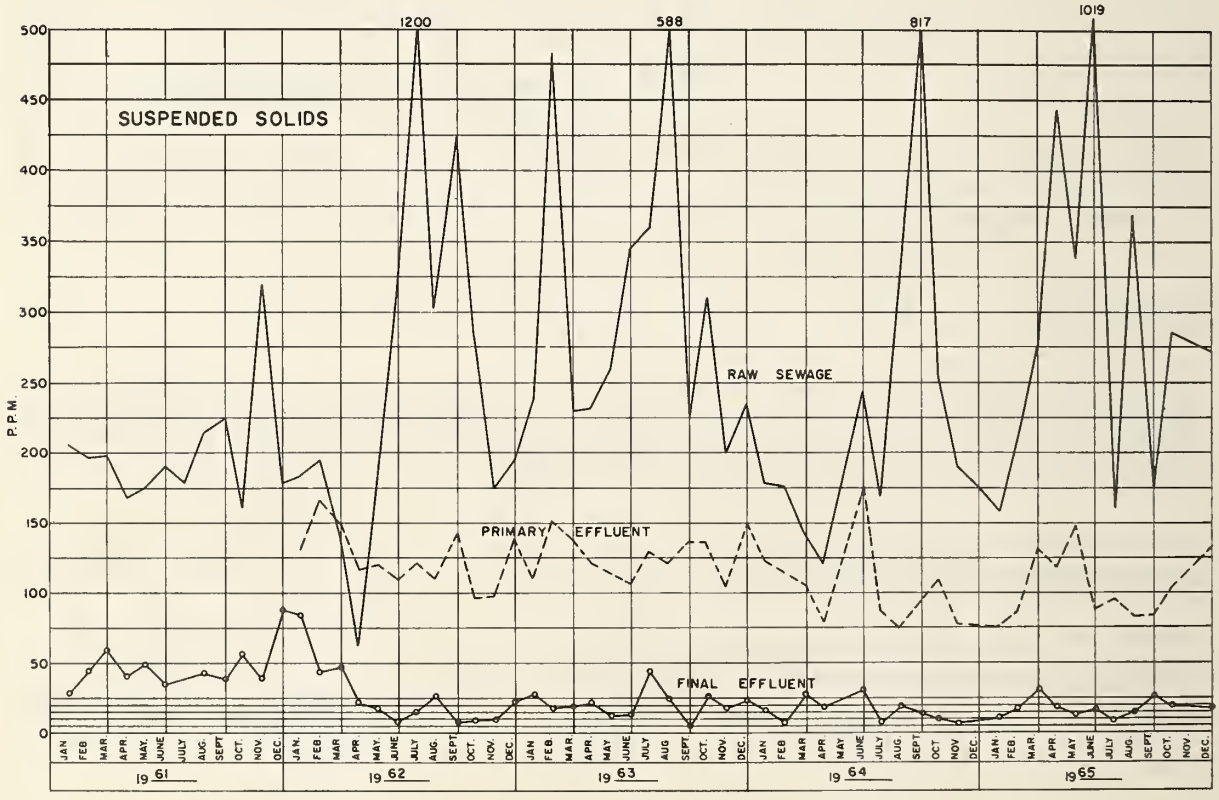
COMMENTS

Raw sewage having an average strength of 211 ppm in BOD and 337 ppm in SS was treated in 1965. The average BOD in the final effluent was 12 ppm which was within the OWRC objective of 15 ppm. The average SS in the final effluent was 17 ppm which was 2 ppm in excess of the OWRC objective of 15 ppm.

The average removal efficiencies of 94.5% for BOD and 95.0% for suspended solids are most satisfactory for this type of treatment.

A total of 1541 cubic feet of grit was removed which was an average of 2.7 cubic feet of grit removed per million gallons of raw sewage.


BIOCHEMICAL OXYGEN DEMAND
P.P.M.
500
450
400
350
300
250
200
150
100
50
0
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
JAN. FEB. MAR APR. MAY. JUNE JULY AUG. SEPT OCT. NOV. DEC.
19 61
19 62
19 63
19 64
19 65


SUSPENDED SOLIDS
P.P.M
500
450
400
350
300
250
200
150
100
50
0
1200
588
817
1019
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
19 61
19 62
19 63
19 64
19 65

MONTH	PRIM. EFFL B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	96	1435	31	2095
FEBRUARY	110	1482	34	1736
MARCH	175	1605	73	879
APRIL	102	1485	35	1825
MAY	88	1382	34	2020
JUNE	143	1535	40	1602
JULY	146	1452	37	2219
AUGUST	94	1603	20	3690
SEPTEMBER	110	1462	30	2654
OCTOBER	140	1400	64	1310
NOVEMBER	-	1319	-	-
DECEMBER	80	1562	37	2381
TOTAL	-	-	-	-
AVERAGE	117	1477	40	2037

COMMENTS

An increased BOD loading was placed on the aeration section in 1965. This is indicated by the increase in the primary effluent BOD from 105 ppm in 1964 to 117 ppm in 1965 and also by the increased hydraulic load from 1.290 mgd in 1964 to 1.560 mgd in 1965. Therefore, the BOD loading increased from 1355 lbs. per day in 1964 to 1875 lbs. per day in 1965. The average lbs. of BOD per 100 lbs. of MLSS was 40 and the average cubic feet of air per lb. of BOD removed was 2037.

A new 950 cfm blower was installed in 1965 to increase the aeration capacity in order to meet the increased loadings.

DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu Ft
	1000'S CU FT	% SOLIDS	% VOL. MAT	1000'S CU. FT.	% SOLIDS	% VOL. MAT	
JAN	63.70	2.75	-	32.69	2.53	-	-
FEB.	56.09	-	-	31.09	3.28	-	-
MAR.	60.42	2.90	-	30.79	2.32	-	-
APR.	55.85	2.62	-	20.71	3.35	-	-
MAY	55.94	2.34	-	26.57	3.95	-	-
JUNE	52.88	4.40	=	30.86	5.02	-	-
JULY	53.11	4.50	-	10.31	-	-	-
AUG.	56.41	3.27	-	32.08	3.86	-	-
SEPT.	56.57	4.35	-	34.99	2.84	-	-
OCT.	59.44	5.77	-	32.40	3.66	-	-
NOV.	60.45	-	-	31.75	-	-	-
DEC.	51.65	-	-	34.99	-	-	-
TOTAL	682.51	-	-	349.23	-	-	-
AVG.	56.88	3.66	-	29.10	3.42	-	-

COMMENTS

During the year 1965, a total of 4.26 million gallons of raw sludge was pumped to the digesters. At an average concentration of 3.66% this represents a total of 1,560,000 pounds of solids.

The quantity of sludge removed from the digesters during the year was 2.18 million gallons or 51% of the total sludge to the digesters. Sludge disposal at Richmond Hill was by tank truck haulage.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (P.P.M)
JANUARY	39.514	2812	7.12
FEBRUARY	40.912	2464	6.03
MARCH	48.514	2261	4.67
APRIL	63.376	2775	4.38
MAY	43.822	2475	5.65
JUNE	36.845	2458	6.67
JULY	36.311	2511	6.92
AUGUST	33.311	2906	8.74
SEPTEMBER	35.564	2583	7.25
OCTOBER	56.414	2667	4.73
NOVEMBER	64.761	2443	3.77
DECEMBER	70.299	2657	3.78
TOTAL	569.643	31012	-
AVERAGE	47.740	2584	5.45

COMMENTS

Chlorination was carried out throughout the year to reduce the bacterial count of the final effluent. During the year 31,012 pounds of chlorine were required to maintain a 0.5 ppm residual. This represents an average dosage of 5.45 ppm.

CONCLUSIONS

A satisfactory treatment was provided by the plant during the year.

The hydraulic and organic loads are approaching the design capabilities of the plant and at times it is overloaded. There has been a steady increase in load on the plant during the past few years.

RECOMMENDATIONS

Based on an appraisal of the adequacy of the effluent receiving stream, our Division of Sanitary Engineering has recommended that no enlargement of this plant should be planned. The servicing of development in this area of the County of York is at present under investigation.

It is recommended that discussions be held with our Division of Sanitary Engineering on interim action to accomodate unavoidable increase in the load on the plant.

ONTARIO WATER RESOURCES COMMISSION